

Claims

1. A combined sensor and heating element, which is particularly suitable for a motor vehicle seat, comprising a sensor mat which comprises a carrier film and a cover film and sensors and sensor conductor paths arranged between the carrier and cover film, as well as a heating conductor arrangement, characterized in that the conductor paths (4) of heating conductor arrangement are integrated in the sensor mat.
2. A combined sensor and heating element according to claim 1, characterized in that conductor paths (4) of the heating conductor arrangement and/or the sensors (6) and/or sensor conductor paths are arranged on the inside of carrier film (2) and/or of the cover film (3).
3. A combined sensor and heating element according to claim 2, characterized in that the conducting paths on the inside of the carrier film (2) and those on the inside of the cover film (3) are electrically insulated against each other by means of an insulation film and/or insulation varnish (7).
4. A combined sensor and heating element according to claim 3, characterized in that the insulation film and/or insulation varnish (7) are designed as spacers between the carrier film (2) and the cover film (3).
5. A combined sensor and heating element according to any one of the claims 1 to 4, characterized in that the sensor arrangement comprises seat occupancy sensors and/or temperature sensors.

6. A combined sensor and heating element according to claim 5, characterized in that the heating conductor arrangement can be switched and/or controlled by means of seat occupancy sensors.
7. A combined sensor and heating element according to claim 5 or 6, characterized in that the signal of the seat occupancy sensors can be used for airbag control.
8. A combined sensor and heating element according to any one of the claims 1 to 7, characterized in that the seat occupancy sensors comprise pressure sensors.
9. A combined sensor and heating element according to claim 8, characterized in that the pressure sensors comprise so-called membrane switches.
10. A combined sensor and heating element according to any one of the claims 1 to 9, characterized in that the conductor paths (4) for the heating conductor and sensor arrangements are made from the same material.
11. A combined sensor and heating element according to any one of the claims 1 to 10, characterized in that the conductor paths (4) for the heating conductor and sensor arrangements are made of Cu and/or conductive paste.
12. A combined sensor and heating element according to any one of the claims 1 to 11, characterized in that the carrier film (2) and/or the cover film (3) comprise a flexible plastic film.

13. A combined sensor and heating element according to claim 12, characterized in that the plastic film is made of PI (polyimide), PET (polyethylene terephthalate) and/or PEN (polyethylene naphthalate).
14. A combined sensor and heating element according to any one of the claims 1 to 13, characterized in that the electrical connectors of the heating conductor and sensor arrangements are arranged on the carrier film (2) and/or cover film (3) such that they can be connected to the same connector plug.
15. A combined sensor and heating element according to any one of the claims 1 to 14, characterized in that the heating conductor and sensor arrangements can be connected to joint analysis and supply electronics units.
16. A combined sensor and heating element according to any one of the claims 1 to 15, characterized in that it comprises wiring (5) to the analysis and supply electronics units.
17. A combined sensor and heating element according to any one of the claims 1 to 6, characterized in that diodes, switches and/or electronics components are integrated.
18. A combined sensor and heating element according to any one of the claims 1 to 17, characterized in that the sensor and heating elements are separated into zones, which can be switched and controlled independently from each other.
19. A vehicle seat, comprising at least one combined sensor and heating element according to any one of the claims to 18.

20. A vehicle seat according to claim 19, characterized in that on the sitting area and/or seat back of the vehicle seat heating zones are provided, which can be switched and controlled or adjusted independently from each other.
21. A vehicle seat according to claim 20, characterized in that the heating zones are adjusted to the contour of a human body occupying the seat.
22. A method for manufacturing a combined sensor and heating element according to any one of the claims 1 to 21, characterized in that the conductor path structure and/or wiring is at least partially applied by means of a conductive paste application process.
23. A method for manufacturing a combined sensor and heating element according to any one of the claims 1 to 22, characterized in that the conductor path structure and/or wiring are applied at least partially by means of one of the following steps:
 - a) application of a coating made from conductor path material on the carrier film and/or cover film,
 - b) application of etch resist in a pattern, which matches the desired conductor pattern, on the coating made from the conductor path material,
 - c) etching away of the conductor path material in the non-coated areas, removal of the etch resist coating.